

CLAIMS

1. A modular microfluidic system comprising at least one base board having a plurality of fluidly linked fluid supply apertures on one or both sides thereof, a plurality of microfluidic modules adapted to be detachably attached to the base board, each having one or more fluid inlets and/or outlets, and a plurality of fluid couplings to effect releasable fluid-tight connection between a module and a base board via a supply aperture on the base board and an inlet/outlet on the microfluidic module, a fluid coupling comprising a channel means insertable into a suitably shaped recess in such an inlet/outlet/aperture to effect a fluid light communication therebetween.
2. A modular microfluidic system in accordance with claim 1 wherein the channel means comprises a rigid tubular element, with any recess into which such a tubular element is to be received being shaped accordingly.
3. A modular microfluidic system in accordance with claim 2 wherein the tubular element comprises a projecting ferrule integral with and projecting from a first aperture comprising either a fluid supply aperture in the base board or an inlet/outlet in the module, and adapted to be received in a recess comprised as a second aperture, correspondingly either an inlet/outlet in the module or a supply aperture in the base board.
4. A modular microfluidic system in accordance with any preceding claim wherein the ferrule projects generally perpendicularly from a generally planar surface of the base board, to effect a fluid connection between a base board and module adapted to lie generally parallel when connected.

5. A modular microfluidic system in accordance with any preceding claim wherein the channel means have a circular or elliptical cross section.
- 5 6. A modular microfluidic system in accordance with any preceding claim further comprising at least one fluid source aperture fluidly linked thereto to supply source fluid to the system, and/or at least one fluid output aperture fluidly linked thereto to output fluid from the system.
- 10 7. A modular microfluidic system in accordance with any preceding claim wherein the base board is constructed with a pattern of interconnecting microfluidic channels to provide a plurality of fluid channels and/or chambers in use linking in fluid communication at least some of the supply apertures to each other and/or to the source aperture.
- 15 8. A modular microfluidic system in accordance with any preceding claim wherein each microfluidic module comprises one or more microfluidic devices.
- 20 9. A modular microfluidic system in accordance with claim 8 wherein the microfluidic devices include devices selected from the list comprising a reactor, heater, cooler, analyser, detector, mixer, processor, separator or the like, a pump, valve, filter or the like, or a fluid channel, chamber or manifold.
- 25 10. A modular microfluidic system in accordance with any preceding claim wherein each module has a generally planar construction to be incorporated upon a generally planar baseboard.

11. A modular microfluidic system in accordance with any preceding claim wherein different parts of boards and/or modules are fabricated from different materials to provide different functional requirements regarding transparency, structural strength, chemical resistance and the like.

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12. A modular microfluidic system in accordance with claim 11 wherein a board and/or module comprises a composite structure having areas of a transparent material where required, and areas of a chemically resistant material at least in regions where solvent contact is possible, preventing contact with the less resistant transparent substrate material.

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13. A modular microfluidic system in accordance with any preceding claim wherein connecting means are provided to hold the assembly together in use and assist in maintenance of a fluid-tight connection by urging coupling and aperture into closer association and retaining thereat with a suitable urging force.

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14. A modular microfluidic system in accordance with any preceding claims wherein the removably insertable tubular channel means incorporates or is provided with a closure for closing a pathway not being used in a particular device combination.

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15. A modular microfluidic system in accordance with any preceding claim wherein the tubular channel means includes within a fluid channel therewithin a fluidly active component

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16. A modular microfluidic system in accordance with any preceding claim wherein the tubular fluid coupling is metallic tubular channel coupling

such as a metallic ferrule to effect an electrical as well as a fluid interconnection.

- 5 17. A modular microfluidic system in accordance with any preceding claim, comprising a plurality of modules, a base board and one or more intermediate level board constructed in like manner to the base board, the assembly being adapted for multi-level stacking of modules and/or base boards and/or intermediate level boards.
- 10 18. A modular microfluidic system in accordance with claim 17 wherein channel means comprising rigid tubular ferrules are provided at apertures in the upper surface of the base board and at apertures in the upper surface of all intermediate level modules, to be receivingly engaged in fluid tight connection within recessed portions at apertures on the lower surface of all intermediate level components and all top level components.
- 15 19. A method of providing a microfluidic system as a modular assembly comprising the steps of:
- 20 providing at least one base board having a plurality of fluidly linked fluid supply apertures on one or both sides thereof and a plurality of fluid channels and/or chambers linking in fluid communication at least some of the supply apertures;
- 25 providing a plurality of microfluidic modules, each having one or more fluid inlets and/or outlets and at least one fluid channel or chamber in fluid communication therebetween;
- a fluid coupling comprising a channel means insertable into a suitably shaped recess in such an inlet/outlet/aperture to effect a fluid tight communication therebetween.

connecting the modules to the base board via the fluid couplings to effect releasable fluid-tight connection therebetween via a supply aperture on the base board and an inlet/outlet on the module;

- 5 such that the fluid channels or chambers within the modules act in co-operation with fluid channels or chambers in the baseboard to complete a desired microfluidic circuit.